OIT's Petroleum Partnership Portfolio

Project Area	OIT	Cost Share	Total
¤ Petroleum & • Direct	$36M	$ 35M	$71M
Related	$25M	$24M	$49M
		Total	$120M

Safety & Reliability

¤ Mechanical Integrity Global Inspection
¤ Gas Imaging for Leak Detection
- Corrosion Monitoring System
- Metal Dusting Phenomena
- Intermetallic Alloy for Ethylene Reactors
- Alloy Selection for High Temperatures

Advanced Wireless Sensors
Controlled Processing of Tube and Pipe
Acoustic Wave Boiler Tube Monitoring

Energy Efficiency

¤ Energy Saving Separations Technologies
- Advanced Materials For Reducing Energy
- Refinery Process Heater System
- Flame Image Analysis and Control
- Thermal Image Control for Combustion
- Laser Sensor for Refinery Operations
- BestPractices: Motors, Pumps, Steam

Efficient High Temperature Natural Gas Furnace
Dilute Oxygen Combustion
High Heat Low NOx Combustion

Process Improvement

¤Enzyme Selectivity for Desulfurization
¤ Micro Gas Chromatograph Controller
¤ Gasoline Biodesulfurization Process
- Multi-phase Computational Fluid Dynamics
- Gas Phase Thermodynamics Modeling
- Catalytic Hydrogenation Retrofit Reactor
- New Nanoscale Catalysts Based Carbides
- Selective Catalytic Oxidative Dehydrogenation
- Oxidative Cracking of Hydrocarbons To Ethylene
- Alkane Functionalization Catalysts
- Selective Surface Flow Membrane
- Catalytic Hydrogen Selective Membrane
- Advanced Process Analysis for Refining
- Low Profile Catalytic Cracking
- Laser Ultrasonic Tube Coke Monitor
- Membrane Reactor for Olefins
- Furnace Pipe Hangers in Refineries

New Products & Markets

Advanced Sorbents for Gas Separations
Advanced Industrial Materials
Improved Membrane Module Tube Sheets
BioCatalysis Under Extreme Conditions
Carbon Membranes for Gas Separations
Ceramic Membrane for Residual Oil
High Temperature Facilitated Membranes
Reactive Distillation for High Octane Fuels
Hydrogen Recovery Membrane Materials
Improved Alkylation Contactor
Multiphase Flow Measurement
Gel Absorption Azerotrope Separation
Phase Transfer Catalysis
Aromatic Isomer Separation
Hydrogen - Light Hydrocarbon Separation
Catalysis Stability and Regeneration
Thermal Swing Absorption for O_2

Environment

¤ Rotary Burner Demonstration
- Low NOx - Low Swirl Burner
- Internal Recirculation Burner
- Novel Low NOx Burners

Recycling & Recovery

- Membrane To Recover Olefins From Gaseous Streams
- Electrodeionization For Product Recycling and Recovery
- PSA Product Recovery from Residuals